

- N.B.** (1) Question No. 1 is **compulsory**.  
 (2) Solve any **four** questions from the **remaining** questions.  
 (3) Assume **suitable** data if **required**.

1. (a) Explain significance of directivity and radiation pattern of antenna. 5  
 (b) Describe the concept of near field and far field radiation. 5  
 (c) Discuss the voltage and current distribution of a half wave dipole antenna. Can we say the antenna is resonant? 5  
 (d) Differentiate between broadside and end fire array. 5
2. (a) Explain the significance of the term "Effective Area of an Antenna". Derive the relationship between effective area and directivity of any antenna. 10  
 (b) Describe parabolic reflector and its use of microwave frequencies. Discuss Cassegrain method of feeding the parabolic reflectors. 10
3. (a) State and derive FRISS transmission equation. 10  
 (b) What is the maximum power received at a distance of 0.5 km over a free space 1 GHz circuit consisting of a transmitting antenna with a 25 dB gain and a receiving antenna with a 20 dB gain. The transmitting antenna is fed with 150 W of power. 10
4. (a) Explain V antenna and rhombic antenna. List their advantages and disadvantages. Mention their applications. 10  
 (b) Explain and derive equations for total electric field, directivity, half power beam width in case of two isotropic point sources of same amplitude but opposite phase. 10
5. (a) Explain the difference in driven and parasitic elements in an antenna array. Differentiate between a director and a reflector. 10  
 (b) Explain the formation of inversion layer in the troposphere and the phenomenon of duct propagation. Which factors help in the formation of duct? 10
6. (a) Derive the expression for vector potential wave equation. 10  
 (b) Explain different types of horn antennas. Find the directivity and beamwidth. 10
7. Write short notes on :— 20
  - (a) Ionospheric propagation
  - (b) Log periodic antenna
  - (c) The equivalent noise temperature of an antenna
  - (d) Folded dipole and its applications.